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FOREST EXPERIMENT STATION
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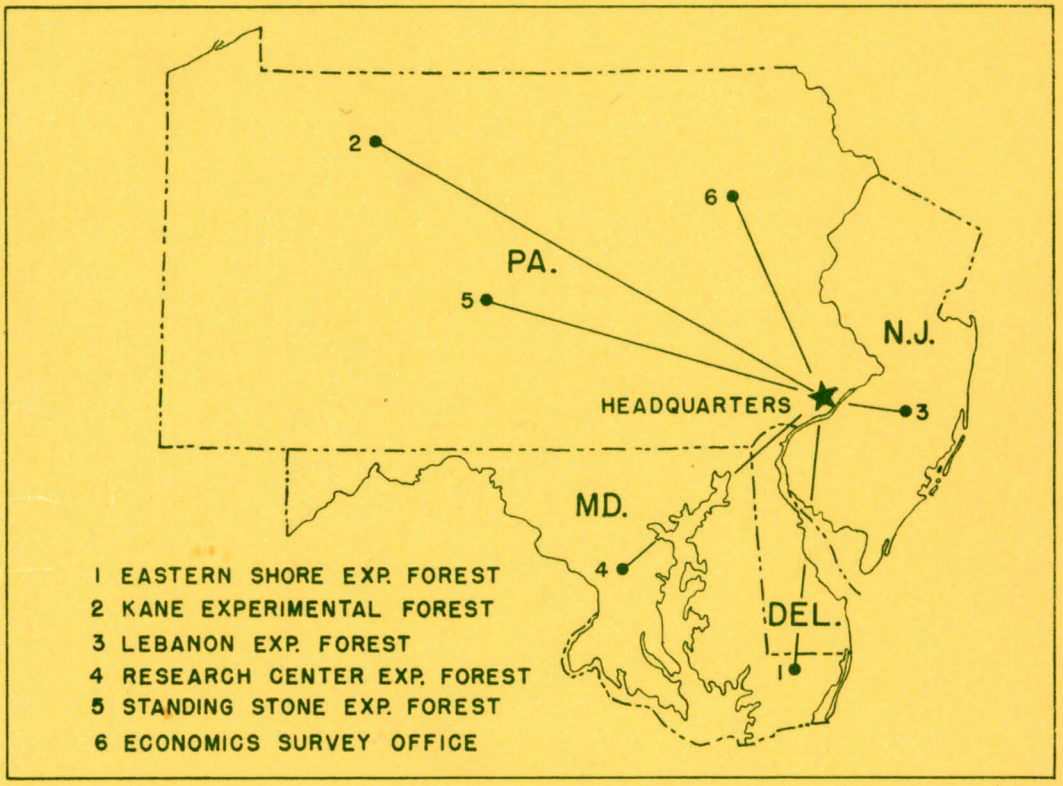

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EXPERIMENT STATION

Maintained by the United States Department of Agriculture
Forest Service and Bureau of Plant Industry, at Philadelphia Pa.
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Report of the

Allegheny Forest Experiment Station

For 1940

DEMANDS ON OUR COUNTRY'S FORESTS FOR DEFENSE

Federal Forest Experiment Stations may profitably review their past accomplishments and their current plans in the light of our country's efforts to achieve an impregnable national and hemisphere defense. The totalitarian challenge is both military and economic. The outstanding lesson Nazi Germany has taught the world is that tremendous power can be quickly mobilized by modern industrial nations when every effort of their people is focused toward that single end. In little more than six years, Germany developed from an economically prostrate country of negligible military power to one that dominates the whole of continental Europe. The world, and especially the future demagogues and dictators, are unlikely ever to forget this lesson, and democracies will do so at their peril.

To prepare her forests and forest industries for total war, Germany took the following steps: (1) increased the degree of thinnings, thereby increasing the total yield capacity of the forest; (2) prohibited the use of tree seed or seedlings that had not been certified by the government as being of high quality race or strain; (3) prohibited clear cutting; (4) developed improved logging and milling machinery, much of this fitted with pneumatic tires for rapid transport on highways; (5) developed efficient wood gas generators for domestic heating and cooking purposes; (6) developed and put into every-day service wood burning motorcars, busses, and trucks; (7) developed by intensive research complicated chemurgic processes whereby wood is converted into substitutes for wool, stock feed, and other important basic commodities. This program was accompanied by an unprecedented increase in housing for urban workers and other developments involving use of wood.

These steps include both long time and short time objectives and were imposed upon the nation by the power of a dictatorship. Immediate and permanent national security for the United States require that our forests and forest industries also be developed to meet our country's peace and wartime needs. Can we effect mobilization of our forests and wood using industries for national defense and for permanent national welfare within the framework of democratic institutions? The record of our handling of the nation's agricultural problems indicates that we can. In an address before the faculty and student body of Pennsylvania State College last September 24th, Secretary Wickard stated that no industry in the United States is better prepared to go on a wartime basis than agriculture. The Department and the people of our country can well be proud of this fact. During a preparedness program or even

during a war, the farms of our country can supply us with adequate food, fiber, and other agricultural products, without undue increase in price, without bringing under cultivation steep slopes or arid land, and without jeopardizing soil fertility. Agriculture has found a way of imposing necessary nation-wide controls with a minimum sacrifice of farmer independence. True democracy has increased thereby because the farmers themselves for the first time now participate in formulating and administering the controls that determine their destiny.

The outstanding current need in forestry is to develop similar controls to assure that: (1) forest lands be kept productive; (2) growing stock and reserves are both adequate and properly located to meet peace and wartime needs; (3) sustained yield units be organized around each important forestry industry; and (4) permanent forces of skilled woodsmen and wood workers, able to handle peace time business and to expand in time of war, be trained and maintained in each sustained yield unit.

Research Program Implied

To accomplish these major objectives, and thereby, to assure that our country will always have available at a reasonable price an adequate supply of timber near its great industrial centers, requires a number of farseeing forestry measures. Most of these have been clearly outlined in the program presented by the Forest Service to the Joint Congressional Committee on Forestry. To make such a program effective in the Allegheny Station territory, answers to the following questions are needed.

1. Can forest fires be more effectively controlled? In these days of incendiary bombing, the importance of forest fire control to national defense is obvious.

2. Can cutting systems be devised whereby our second-growth stands supply the timber required by industries, and income needed by owners, while building up future productive capacity? This question must be answered separately for the oak-pine type in New Jersey, the loblolly pine type of Maryland and Delaware, the oak type in all four states, and the northern hardwood type of Pennsylvania.

3. Can harvest cuttings in the remaining old-growth northern hardwoods be prolonged? Most of this timber is holdover from previous cuttings, yet such trees today represent a valuable reserve for sustaining specialty industries.

4. Can the effectiveness of forest planting programs be improved through selecting and developing seedlings or clons resistant to drought and cold, of good genetic quality, and properly nourished to grow rapidly when set in the field; and through discovering a sound basis for allocating species to sites?

5. How much timber is in the territory, how fast is it growing, and how rapidly is it being consumed through cutting, decay, and fire?

6. What market outlets exist for timber, especially that located within sustained yield units, soil conservation districts, and forest farming units; and how can timber marketing be placed on a more stable basis?

7. How can forests better serve community needs for sustained yield forestry, for recreation, for watershed protection, and for other community purposes?

8. What is the precise role that forests play in the control of floods, including mine water, and in protecting water supplies for our large urban centers?

9. How is forest productivity influenced by forest wildlife, forest insects, and tree diseases?

10. To what extent can more efficient use be made of existing timber supplies through (a) utilizing products that now go to waste; (b) changing specifications for existing timber uses; and (c) improving logging methods so that smaller yields and lower grades of products may be economically harvested?

Contributions that the Station has made during the past toward meeting the problems outlined are set forth in the following pages, together with immediate plans for future work. In the final section a program of research adequate to meet present and forseeable future needs is outlined.

LAST YEAR'S ACCOMPLISHMENTS

In the Station's 1939 Annual Report, it was concluded that the major forest problems of the territory center in the management of private forest land. Out of a total of 20,000,000 acres, only 4,000,000 are likely to pass into public ownership within the near future; 5,500,000 acres are in farm woodlots, and 11,500,000 acres are in industrial and other ownership. Research directed towards improving the returns to be had from private forest management, and towards supplying the technical background for public controls needed to maintain forest productivity, regulate growing stock, and protect watersheds, is the outstanding need.

Forest Management

An over-all appraisal of the past and present Forest Management work of the Station brought out the desirability of concentrating effort chiefly in the oak-pine stands of the Coastal Plain in New Jersey, Delaware, and Maryland, and in the northern hardwood stands of the Allegheny Plateau. In doing so, the Station realizes that the oak type, which covers more area than any other, should not be permanently overlooked. However, the excellent work being done in this type, by the Department of Conservation and Development in New Jersey, Bureau of Forestry in Pennsylvania, and by Pennsylvania State College, fills this gap more adequately than the Station could expect to do from resources now at its disposal.

Northern Hardwoods

The Station's problem analysis of the northern hardwood-hemlock type of the Allegheny Plateau in New York and Pennsylvania brought out that 8,500,000 acres were originally occupied by beech-birch-maple-hemlock stands. Timber cutting and manufacturing was at one time the major industry throughout this territory. Supplemented by tanneries, wood chemical plants, and pulp mills, it gave employment to thousands of workers. In 1937 the forest industries of the northern hardwood region of Pennsylvania employed 10,860 workmen; metal industries 13,485; electrical and radio manufacturing 9,785; textiles 6,524. The fact that forest industries still rank second in employment, after practically all the virgin timber has been exhausted and much of the second-growth removed, emphasizes the importance of forests to the economy of the territory. Though oil wells, resort business, and general manufacturing are more famous on the Plateau, paper mills, wood chemical plants, small sawmills, box factories, planing mills, and other wood working establishments still form a mainstay in the local economy.

Among the important forest problems of the Allegheny Plateau are: (1) the cost and economic feasibility of light, selective cutting, particularly on relatively steep areas; (2) how to increase the quantity of high grade materials that can be harvested from the forest, since too much black cherry, sugar maple, white ash, and other valuable species is being cut for chemical wood and too little allowed to reach sawtimber size; (3) the yield that can be obtained by applying periodic light cuttings to second-growth stands, removing chemical wood and pulpwood as thinnings and retaining the better stems for sawtimber; (4) the extent to which clear cutting of immature second-growth stands increases the percentage of sprouts and undesirable species in the third growth; (5) the feasibility of weeding and improvement cuttings in second and third growth; and (6) how to improve forest planting technique, thereby increasing the success of plantations.

The fact that cutting trees between five and eight inches in diameter for pulpwood is uneconomic, both for the wood cutter and the pulp mill owner, was brought out in a cooperative study carried on by the Division of State and Private Forestry of Region 7, the Armstrong Forest Company, and the Station. The conversion time per cord averaged 11.5 man hours when all trees 5 inches and up were cut, as opposed to 9.6 man hours when all trees 8 inches and up were cut. The conversion time per cord for trees between 5 and 8 inches in diameter was found to be 15.5 man hours as compared with 9.6 for trees 8 to 11 inches, and 11 inches and over. Stacked cords of 52-inch wood made up of trees 5 to 7.9 inches in diameter, had 89 cubic feet of solid wood; those of trees 8 to 10.9 inches, 97 cubic feet; and those made up of 11-inch trees and larger, 105 cubic feet. Labor required to cut, peel, buck, and stack 100 cubic feet of timber cut from 5 to 8-inch trees was 1.9 times as great as that required to prepare the same amount from 11-inch and larger trees. The significance of such a study to the industrialist and laboring man is evident. The study also indicates that partial cuttings are certainly feasible in stands of this character, and that little excuse exists for cutting pulpwood much below an 8-inch diameter limit.

During the past summer, the Station studied in detail a 116-year old black cherry-sugar maple stand that had been partially cut 45 years earlier and again in 1939. From tallies of trees left, numbers and radial growth of stumps cut in 1939 and old stumps remaining from the original cutting, an attempt was made to determine the original stand, the original cut, and growth, in the period between the two cuttings. Preliminary estimates are:

Removed per acre in 1894	7,500 bd. ft.
Removed per acre in 1939	8,839 " "
Left per acre in 1939	5,000 " "
Total yield for 116 years	21,339 " "

In addition, 15 cords of chemical wood were removed per acre in 1939. Stands of this character rarely exceed 14,000 board feet per acre at any age; therefore partial cutting at 71 years of age probably increased the total yield for the 116-year period by approximately 7,500 board feet. Had cuttings been lighter and more frequent, even greater yields might have been obtained, since light cuttings permit more complete utilization of growing space, and tend to reduce damage from glaze and wind storms.

An analysis of 7 years' weather records from three stations less than one mile apart, one located in a virgin forest, a second in a clearcut area, and a third in a frost pocket, brought out the striking fact that the growing season averages from 20 to 40 days shorter in the frost pocket than on the adjoining upland or virgin forest. Frost pockets are exceedingly slow in reproduction of timber following clear cutting. Even exclusion of deer and rabbits by fencing does not insure that tree reproduction will become established promptly. Low areas along streams, upland swales and other places of poor air drainage are likely to develop into frost pockets following clear cutting of timber. Either such open areas must be tolerated in our forests or clear cutting must be avoided on them.

Final analysis of data collected several years ago in a comprehensive survey of second-growth forests, involving a detailed study of 68 one-half acre sample plots from 17 geographic localities distributed over the Allegheny Plateau, revealed that topography and aspect had very definite influences on the species composition of the stands. Sugar maple was found to be more prevalent on the upper and middle slopes than on the Plateau or on the lower slopes. Yellow birch and red maple were more abundant on the Plateau and lower slopes than on the upper slopes. The cool, moist micro-climate known to prevail on the middle and lower slopes appeared definitely to favor yellow birch. The composition was less influenced by topography where the slopes were gentle than it was where the slopes were steep. Red maple and black cherry were found to be more abundant on the north to northeast and the south to southeast facing slopes, whereas beech was more abundant on the west and northwest facing slopes. Sugar maple, like black cherry, was significantly more abundant on the east and southeast slopes than on the south and southwest slopes.

Fires were found to have caused a pronounced decrease in the percentage of sugar maple, beech, and hemlock in second-growth stands, with a corollary increase of sweet and yellow birch, red maple, pin cherry, and black cherry. Light cuttings in the original forest were found to favor beech, sugar maple, hemlock, and yellow birch, at the expense of black cherry, sweet birch, and red maple. Heavy cutting, on the other hand, favored the latter species.

In cooperation with the Pennsylvania Bureau of Forestry, the Station completed a study of 73 western Pennsylvania forest plantations, 5 years of age and older. Red pine stood out above all other species in having high survival, rapid growth rate, and well-formed boles. Japanese larch, though low in initial survival, exceeded all other species except red pine in height and diameter growth. Bole form in both Japanese and European larch was good. Norway spruce shows promise as a pulpwood species on the high plateau, though it is likely to give low survival if planted in the open or in competition with grass, and cannot compete successfully with hardwoods without cleaning. White pine was least successful of all, largely due to weevil injury. Seven test plantations of jack pine, red pine, pitch pine, Scotch pine, and black locust established in 1938 showed excellent first year survival. Deer had browsed heavily on red pine, lightly on black locust. Leader growth of 2-1 red pine stock the first year in the field was approximately proportionate to the initial top length. On heavy soils, losses due to frost heaving were approximately twice as great for small-sized stock as for stock of average or large size. Plantations of graded black cherry stock showed a consistent increase in frost resistance with increase in initial size of the stock. Cherry stock was, in general, more frost resistant than either yellow poplar or white ash.

Plans for 1941 include the following tasks: (1) the manuscript on the forests of the Allegheny Plateau will be completed; (2) results of the study of the older plantations of western Pennsylvania will be published; (3) the weeding-plot experiments will be remeasured and reappraised; (4) studies will be initiated to determine the effect of light, selective cutting in (a) a rapidly deteriorating old-growth stand on the Kane Experimental Forest, and (b) a thrifty second-growth stand that has now reached merchantable size; (5) effort will be concentrated during the coming field season in translating into silvicultural practice the knowledge gained from silvical studies which will be concentrated in second growth-stands, and will be stressed only to the extent that they are needed to form the basis for sound cutting practices; (6) the Station hopes that it can stimulate ecologists and other scientists at universities to make full use of the Tionesta Natural Area, and particularly to study the factors underlying the death of a number of the older trees, and the response that the forest is making to reclaim the space relinquished by the veterans.

The Oak-Pine Type

The oak-pine type includes 1,300,000 acres of poor quality stands on the Pine Barrens of southern New Jersey, and approximately 1,000,000 acres of good quality loblolly pine lands in Delaware and the Eastern Shore of Maryland. The subdivisions of the New Jersey Pine Barrens include swamp forests, 12%; poorly drained St. Johns soils, supporting pitch pine, 14%; infertile Lakewood sand, supporting pitch pine and poor grade oaks, 22%; the somewhat better quality sassafras sand, supporting better growth of oaks and shortleaf and pitch pine, 52%. The original economy of the region, based on supplying charcoal for bog iron smelters, cordwood for railroads, steamboats, and domestic use, and fuel for glass works and potteries, at one time supported a reasonably prosperous population in the Jersey Pine Barrens. Depleted by unregulated cutting and fires, this forest area today supports few inhabitants and is recognized as a major problem area of the State, where tax delinquency, unscrupulous land promotion, poverty and economic frustration abound. Cranberry and blueberry growing, summer home development, and hunting supply the chief basis of local economy. Stabilizing land ownership is one of the prerequisites to better forest practice. The Plains and the hardwood swamps in the Barrens are essentially non-productive. Oaks produce about 25¢ per acre annually, pine under management earns 70¢ to $1.25, and Atlantic white-cedar nearly $4.

Among the forest research needs of this region are (1) a land classification survey; and (2) studies in how to increase and maintain the percentage of pine in the oak-pine type; in how to reproduce white-cedar stands and how to extend the type to swamps occupied by hardwoods and to St. Johns soils; in how to thin and harvest cedar -- long term studies.

The loblolly pine forest is subdivided into some 600,000 acres of loblolly and pond pine, and approximately 400,000 acres of swamp forest including cypress, gum, various oaks, red maple, holly, and Atlantic white-cedar. The region is chiefly agricultural, income being derived mainly from truck farming and dairying, supplemented by fishing in the Chesapeake Bay and the Atlantic Ocean. Large amounts of timber are used locally for baskets, crates, boxes, barrels, planing mill products, piling, fish pond poles, rural and urban construction, and smaller amounts for boat building. Forestry and agriculture are intimately interdependent in this territory. Timber growth is rapid; loblolly pine woodlots in Worcester County, Maryland, average 360 board feet per acre annually. Harvesting of holly sprays and weaving them into wreaths forms an important winter industry.

Among the problems that the Experiment Station should solve, to place the practice of sustained yield forestry in the loblolly pine type on a firm foundation, are to determine: (1) more accurately the timber requirements of the territory, and how far these can be met by locally grown material; (2) how to harvest loblolly pine so as to obtain the maximum yield of valuable products throughout the rotation; (3) how to improve the quality of timber grown in the swamps, especially how to maintain a more favorable representation of the valuable white-cedar and cypress; (4) how to harvest holly so as to assure continuous supply of valuable sprays without seriously injuring the capacity of the trees to produce sprays.

Having learned from small scale experiments that a mineral soil seedbed is necessary to obtain satisfactory reproduction of pine, the Station last year, in cooperation with the New Jersey Department of Conservation and Development and the CCC undertook large scale tests to discover a feasible method of preparing seedbeds. Ten pine seed trees were reserved and the remaining stems cut, yielding 6 to 12.5 cords of small sized material and 300 to 1,800 board feet of logs. The soil was scarified by a standard road ripper and by a heavy disk. A total of 42 acres of sample plots were established. The road ripper did the best job of exposing mineral soil, but required a crew of three men to operate it, and was considerably slower in operation than the disk. A heavier type disk such as the Athens plow, that has proved very successful in preparing seedbeds in jack pine stands in the Lake States, might have proven more successful than the disk used. Soil preparation was too late for regeneration last spring.

Common observation shows that pine seedlings frequently become established on burned-over land. The Station began another large controlled burning experiment last year, to determine how many fires are required to prepare soil for pine seedlings, and what degree of thinning of the oak is necessary in addition to that produced by the fires.

Preliminary results of a reconnaissance survey of Atlantic white-cedar swamps indicate that: (1) white-cedar stands are essentially even-aged and a subclimax of the swamp hardwoods; (2) although white-cedar seedlings may start in great numbers (as many as one million per acre in mature cedar stands), seedlings older than one year are found only in understocked stands; (3) hardwood reproduction is usually taller than that of cedar in understocked stands; (4) the important factors unfavorable for establishment of cedar seedlings are flooding, insufficient light, and inadequate seed supply; (5) open conditions, hummocks above the water table, and a supply of seed from a stand of seed-bearing age within two chains distance, are necessary to encourage adequate natural reproduction of white-cedar; (6) cedar produces seed at ten years of age, giving it a slight advantage over hardwoods in capturing open sites; (7) white-cedar can be grown on St. Johns soil.

The Station completed an analysis of data in the loblolly pine type, collected from the timber survey of Worcester County, and prepared volume tables for local use.

The main effort during 1941 will be concentrated in New Jersey on studies of the cedar type. This will include: (1) determining the distribution of seedlings with reference to size, distance and direction of individual seed trees, and stands of seed trees; and (2) exploring the possibilities of establishing by planting or direct seeding, white-cedar groups in hardwood swamps and on St. Johns soils. The pine reproduction plots established last year will place a heavy work load on the field staff to determine the effectiveness of the various seedbed treatments.

In the loblolly pine type, the Station hopes to get the Eastern Shore Experimental Forest organized as a demonstration and research unit. Division into compartments, cruising of the timber, and the establishment of selective cuttings that will guide local practice will be given high priority. It is hoped that a complete management plan for the area can be prepared during the coming year.

Fundamental Studies

The Beltsville Research Laboratory and Experimental Forest were formally turned over to the Allegheny Station last year. The laboratory will be devoted primarily to fundamental studies that have nation-wide significance. Such studies will supplement rather than replace similar work in the regional Stations. Among the problems under consideration for investigation are: Factors influencing the drought and cold resistance of tree seedlings; the nutritional requirements of tree seedlings and older trees; the effect of various toxic substances, particularly fungicides and insecticides, on seedlings and older trees; physiologic and other tests of seed ripeness; methods of seed collection, seed extraction, storage, and germination; the influence of light upon senescence, death, and clearing of lower branches; the reaction of trees to defoliation, such as is caused by insects and in some cases, fungi; and such other fundamental studies as may from time to time be brought in from the various Stations.

During the past year, the laboratory and grounds have been prepared for occupancy and use, a survey of the general field of physiologic problems has been made, and a review of the literature on the effect of growth substances on plants initiated.

During the coming year it is planned to divide the forest into compartments, to make a timber inventory, and to prepare a general management plan for the handling of the experimental forest. Active work on studies of drought resistance will be begun. Further surveys of the entire field of studies that can be undertaken at the laboratory will be made. The program will be kept flexible for the first few years so that the laboratory facilities will be available for use in attacking new problems as they arise.

Forest Fire Research

Fires on the 20,000,000 acres of forest land cost the region annually approximately $2,000,000. Direct costs for detection and suppression were $600,000, and damage to timber and other property $500,000. Indirect costs and damages are estimated to be approximately equal to the direct costs. Areas of exceptionally high hazard are the Pine Barrens of New Jersey, the loblolly pine forests of the Eastern Shore, particularly old field stands interspersed with high grass cover, and the scrub oak thickets of the anthracite region.

The major research problems are: (1) developing and testing of suitable danger meters for the territory, including danger indices, preparedness indices, and fire behavior rating; (2) improving planning technique and fireproofing of the forests; (3) developing more reliable methods of appraising damage and estimating the reliability of such appraisals, including methods of appraising loss to intangibles such as game, game cover, loss of forest growing capacity, etc.; (4) determining methods of reducing the number of fires that occur; (5) studying the influence of sustained yield management practices on fire occurrence and the cost of suppression.

Tests carried on during the past year indicate that the Appalachian Type 5-A Danger Meter should be modified by changing the method of appraising the influence of rainfall on fuel moisture content, and by introducing more gradations in the wind velocity factor. The forecast side of the meter was found to agree with the current side only 56% of the time, based on actual New Jersey weather conditions, but after making necessary changes, the accuracy of the forecast side was increased to 79%.

The analysis of fire records of New Jersey for the period 1931-38 has been made, and a manuscript pointing out the significant facts gleaned from this analysis is being prepared.

During the coming year, it is planned to continue efforts to refine the danger meter, to follow up the cost studies on mechanical scarification versus controlled burning, both as a method of seedbed preparation and firebreak preparation, and to complete the manuscript on forest fires in New Jersey.

FOREST ECONOMICS RESEARCH

Among the forest economic problems of the territory are: (1) the possibilities of forest employment in the anthracite region; (2) the role of forests in the local economy in southern New Jersey; (3) the possibilities of reestablishing important wood working centers on the Allegheny Plateau; (4) the economics of farm woodlot management; and (5) the marketing of farm woodlot products. The latter was chosen as one of the most pressing problems requiring study

by the Farm Forestry Committees in New Jersey, Maryland, and Pennsylvania. Farm forestry research funds being unavailable for this study, the Soil Conservation Service furnished men, the States of Pennsylvania and Maryland monetary offsets, and the Station plans, supervision, and clerical aid to carry out on a somewhat reduced scale studies of market outlets in Harford and Baltimore Counties, Maryland, and in Adams County, Pennsylvania. Timber and other forest product buyers were interviewed to ascertain the species, quality, and amount each required, the average prices paid, and where they obtained their material. Card indices were then prepared by tree species, by type of forest products, and by buyers. These were distributed to county agents, farm forestry project leaders, extension foresters, and others who advise farmers and other woodlot owners on the disposal of their timber. Approximately 100 users were interviewed in Maryland, and some 200 in Pennsylvania.

Although all three of these counties are far from self-supporting in timber requirements, the local woodlot owner may nevertheless have difficulty in finding a good market for his timber. This is due, in part, to the fact that active markets have led to overcutting, which in turn drives timber buyers to other regions to get their supplies. Timber purchasing, timber harvesting, sawmilling, lumber seasoning, grading, and timber selling, are each regarded as separate jobs; consequently, the timber may pass through from three to seven hands between the woodlot owner and the lumber user. Much high quality timber is lost through improper sawing and much potentially high quality timber is used for fuel, furnace poles, posts, ground wood pulp, and other low grade uses. Marketing of farm forest products is clearly a fruitful field for further investigation.

Anthracite Survey

The survey of forest employment possibilities in the anthracite region, barely started in 1939, hit its stride early in 1940. A careful problem analysis and plan of action was the first task. This brought out that in the 15 counties comprising the anthracite region 1,600,000 people dwell, all of whom are dependent chiefly on a single basic resource -- anthracite coal. Production of anthracite was approximately 100,000,000 tons in 1917, then has sharply declined until in 1940 it was only half this amount. Unemployed miners alone number 50,000. Development of substitute fuels, and increased mining efficiency (one man now mines three tons per day as opposed to two tons in 1924) make it unlikely that any appreciable percentage of these men will ever be reemployed in the mines. The 2,877,000 acres of forest land have been seriously depleted by overcutting and repeated burning.

One of the most important obstacles to increased forest production is the prevalence of forest fires. Mr. Edward Ritter of Region 7, working with the Station and the Department of Forests and Waters, unearthed a series of fire improvement projects that had been proposed by District Foresters some three or four years earlier. These were

checked over in a general way in all counties, and in detail for Wyoming Valley. The projects for the most part were found to be desirable, and justifiable provided a forest improvement program follows. The total number of man days that could be absorbed in this work is approximately 2,500,000.

To determine the possibilities of blocking out county forest units from tax delinquent land, the Station undertook a survey of tax delinquency in the 15 anthracite counties, and at the same time got information on land ownership and assessments. The study of county records brought out that tax sales had been very irregular in the past (Luzerne County had made none between 1912 and 1940), and inasmuch as a period of two years is allowed for redemption following the assumption of county custodianship over the land, very little land was found to be in bona fide county ownership. Most of the parcels are widely scattered and of relatively small size; therefore, the immediate blocking out of county forests seems impracticable. The study brought out that only 1.1% of the total general property tax of the 15 counties is derived from forest land, though 22.6% of the county revenue comes from forest land in Sullivan County, 16% in Pike County, and 12% in Wyoming County. The yearly tax on forest land averaged 12 cents per acre, but in one county was as high as 26 cents.

To obtain specific information on the timber growth and requirements of the region, a forest inventory was found necessary. With the aid of Garver and Girard special instructions were drawn up, volume tables prepared, maps for field and office use drafted, and WPA workers recruited and trained to do the field work. Trees were tallied by sizes on one-fifth acre plots located at 8-chain intervals along lines three miles apart. During the year 82% of Luzerne County was covered. The data collected are comparable in adequacy and accuracy to those collected by the nation-wide forest survey.

Local community leaders and industrialists, through the Anthracite Institute Committee of Twelve, have become very much interested in the possibilities of absorbing the unemployed in a forestry program, and also in the possibilities of using such an unemployment program as a means of curtailing bootleg mining. The Station will continue to cooperate with these agencies in trying to get an action program under way, and in suggesting other means of achieving the same end.

During 1941, (1) the inventory of Luzerne County will be completed and extended to adjoining counties bearing coal lands; (2) a survey of timber requirements and local drain from forest lands will be made; (3) a short publication setting forth the forest situation in Luzerne County will be prepared; (4) the study of tax delinquency, begun last year, will be continued provided county records have been brought sufficiently up to date to justify doing so; and (5) the Station will continue to encourage planting of mine refuse banks on an experimental basis. Experimental controls for such plantings will be undertaken where possible.

FLOOD CONTROL SURVEYS

A clear concept of what constitutes an adequate flood control survey last year brought forth the need of more intensive preliminary examinations, and the introduction of a new initial step, the reconnaissance investigation. This step enables the flood control organization to take full advantage of opportunities afforded by recent floods to get local information currently on flood and erosion damage, flood stages, and stream hydrology. Such data form the basis for determining whether or not a preliminary examination is justified, and in addition, gives the Secretary of Agriculture information to answer local requests for aid.

In the preliminary examination the basic hydrologic and damage data are collected that will enable the survey party to decide: (1) are damages sufficiently great to justify an action program; (2) is improper land use so extensive that an improvement in land management will result in reduction in flood peaks; and (3) will this reduction in flood peaks cause an important reduction in flood damage? The preliminary examinations also determine those tributaries that are important flood contributors.

The final survey, actually a field work plan, will determine for these important flood-contributing tributaries the type and location of land use program that must be introduced to reduce the flood hazard, and will estimate the cost of such a program and the benefit to be derived therefrom. The action program then can proceed immediately without the necessity of preliminary planning; it is only necessary to plan the method whereby the specific jobs already detailed in the survey report will be carried out. This clarification of procedure has done much to improve the usability of our flood control survey reports.

New Basic Information

During the past year, flood control surveys in the Northeastern States made some very important contributions to basic information needed to increase the reliability of surveys.

A series of coefficients were worked out whereby a definite evaluation of the benefits of a specific cover type on retardation of runoff can be estimated. These are based on all the information secured from experiments carried on by the Forest Service, the Soil Conservation Service, and other agencies engaged in studying the influence of vegetation on infiltration rate of soils and on stream behavior. Though admittedly subject to revision, use of such coefficients will prevent the submission of inconclusive reports such as the one now available on the Youghiogheny.

A considerable amount of information was collected last year on the influence of vegetative cover on snow accumulation, snow melt, and runoff therefrom. On the Allegheny watershed it was found, for instance, that significantly greater quantities of water are stored as

snow under good forest cover, than under poor forest cover, or in the open. Melting characteristics, however, are such that daily contributions to stream flow from forested watersheds are 25% less than those from open lands. Also, the melting peak for forest land was found to occur several days after that for open land. These two features alone would tend to flatten any flood peak. Throughout a large portion of the Upper Susquehanna watershed approximately 8 inches of moisture accumulated in the form of snow, which raised the river to flood stage during the period of snow melt. This flood caused heavy damage in the region from Wyoming Valley to Sunbury. The survey party worked long hours obtaining gage readings at strategic damage points throughout the watershed.

From records obtained this year from gaged watersheds, it appears that with the same intensity of precipitation, peak flows from open land may be from 10% to 15% higher than those from forested areas. Supporting evidence is supplied by the Westfield River drainage with records from 1911 to date. Originally 40% forested and 60% agricultural, it now has 60% in forest and 40% in agriculture. During the period, precipitation increased 5.31 inches, runoff only .93 inches. The water retained on the land for use by vegetation increased 4.38 inches.

Decade	Precipitation	Runoff	Water Retained on Watershed
1911 - 1921	42.24"	25.72"	16.52"
1928 - 1937	47.55"	26.65"	20.90"

Studies of humus depth on the Connecticut watershed reveal that following clear cutting of forests, a rapid deterioration of humus occurs until a new stand is thoroughly established, whereupon the building-up process starts again. In 30 years time, temporary forest types accumulate humus to a depth of 1.0 inch; permanent forest types to 3.0 inches. Investigations indicate that one cubic inch of humus is capable of storing at least .4 cubic inches of water for 24 hours, which leads to the conclusion that a forest stand comprised of long lived species has three times greater water storage capacity in its humus layer than do the temporary types.

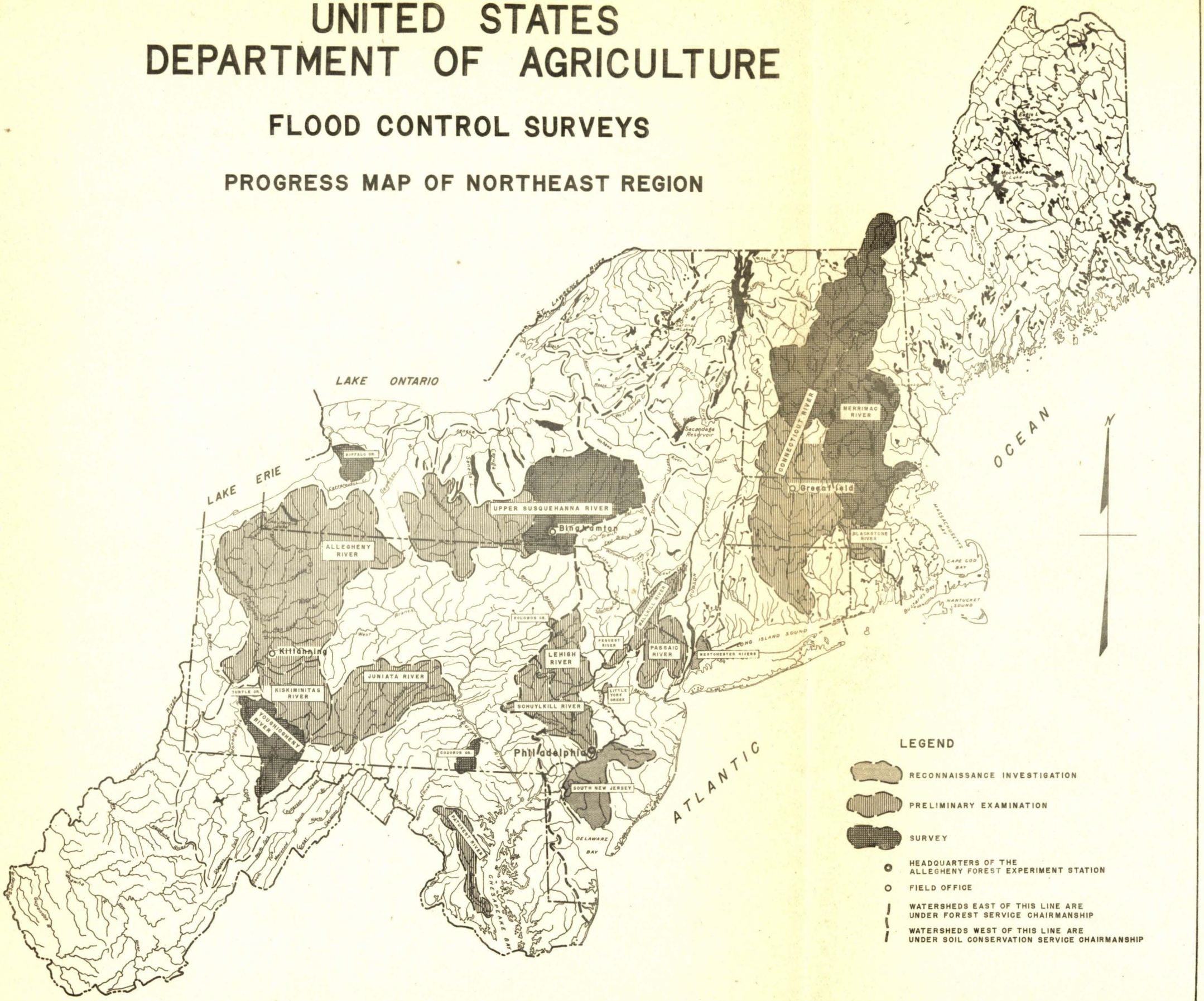
At this stage of the survey, extension of forest cover to open lands, where economically feasible, and rapid conversion of temporary forest types to permanent forest types, give promise of being the most efficient means of raising the water retention capacity of this watershed.

Snow surveys, streamflow measurements on small gaged watersheds, and infiltration runs with both type FA and type F infiltrometers have yielded results to date disclosing significant differences in the infiltration capacities between major soil-cover complexes. It has proved practicable to correlate these various methods of measuring the hydrologic influences. Tests on the Susquehanna watershed showed that relatively constant ratio exists between data obtained by use of the

UNITED STATES
DEPARTMENT OF AGRICULTURE

FLOOD CONTROL SURVEYS

PROGRESS MAP OF NORTHEAST REGION



type FA infiltrometer and data obtained by the type F apparatus. A sufficient range of infiltration capacities should be obtainable from the gaged watersheds to construct an average infiltration curve, and differentiation of this curve by either the Horton or the Sherman method should give the true infiltration curve. This can be used to check the infiltration curve obtained by the infiltrometer. Thus it appears possible to obtain accurate results for a wide range of soil and cover strata by combining the flexibility of the instruments with the accuracy of the gage records.

Status of Reconnaissance Investigations

Milford Creek, New Jersey

In response to a local request to the Secretary of Agriculture, an investigation was made of a local flood that occurred on Milford Creek, New Jersey. In addition to producing a land slip that blocked a train, this flood caused important erosion and siltation. Most of the watershed is in open farms with a few woodlots concentrated on the steeper slopes. The evidence collected indicates that a preliminary examination should be made.

Westchester Rivers

Several small rivers and creeks in Westchester County, New York, on which floods had occurred, were investigated. These watersheds are now in urban and suburban use, and for the most part have good vegetative cover. The flood problems involved are such that an agricultural program could do very little in relieving them. It was recommended that no further examination of these watersheds be made by the Department.

Rancocas Creek and Southwest New Jersey

On September 1, 1940, a freak rainstorm struck southwest New Jersey. As much as 15 inches of rain fell in one area within a period of 24 hours. Such a storm caused rapid swelling of streams and overflowing of their banks. The problem was greatly aggravated by numerous channel restrictions at bridges, culverts, and dams. The stored-up flood waters finally broke through these barriers and released a volume of water far too great for the stream channel to handle, causing flood damage to towns and villages throughout southwest New Jersey as well as considerable damage to highways and railroads. A report will be completed in the near future for this flood problem.

Status of Preliminary Examinations

Pequest River

Flood damage along the Pequest River occurred chiefly in a truck farming area of some 1,000 acres, occupying muck lands through

which the Pequest River flows. The inadequate river channel allows flood water to spread out over the muck land, ruining crops. It was assumed that the condition could be alleviated by channel improvements through the muck area, and a design for such improvements was prepared by Flood Control. Subsequently, the New Jersey Department of Conservation and Development made a contour map of the 6,500 acres of muck lands and found that the land slopes appreciably. The channel improvements recommended by the U. S. Engineers in their preliminary examination will provide adequate flood protection for only approximately one-third of the muck area. The remaining area is flooded by streams from adjoining uplands. Inasmuch as the proposed improvements will eliminate only a portion of the annual flood damages, the problem now confronting Flood Control is whether or not the remaining areas have enough damage to justify a survey, and if so, whether the damage occurs by reason of flood waters or because of faulty drainage. If drainage alone is involved, the problem is not one for flood control.

Schuylkill River

The Schuylkill River channel has been seriously clogged by anthracite culm that is dumped into the river by collieries and washes into the river from refuse banks left by mining operations. Parts of the stream also receive a considerable amount of sediment from eroding farmland. The importance of this erosion must be determined before a preliminary report can be prepared, as this is the only phase of flood control on the Schuylkill over which the Department of Agriculture would have jurisdiction.

Juniata River

The Juniata watershed contains 3,409 square miles, of which 55% is forested, and a considerable additional area is sub-marginal land that should be returned to forest. Much of the forest has been cut without regard to maintaining adequate cover and is subject to repeated burning. The present poor condition is far from affording maximum watershed protection. Additional information must be obtained on stage-damage relationships, however, to determine the economic justification for a survey.

Turtle Creek

A preliminary examination on Turtle Creek was completed this year. The examination indicates that no feasible program by the Department of Agriculture is likely to result in important reduction in flood or erosion damage. Erosion and deposition occur chiefly as a result of industrial operations, in only a very small portion of the watershed.

Solomon Creek

Solomon Creek drains an area of some 18 square miles. Approximately 65% is forest land severely burned-over; the remainder is urban and industrial land with a few idle tracts in industrial centers.

The upper half of the watershed was originally well forested, but cutting for mine props and repeated burnings have led to almost total destruction of forest cover, and erosion to bedrock in some areas. Serious flood damage occurs as a result of channel silting in the borough of Ashley and the adjoining city of Wilkes-Barre, through which the creek flows to reach the Susquehanna River. Channel improvements have already been completed in the borough, but unless the good forest cover is restored on the upper portion of the watershed, the benefit of the improvements is likely soon to be destroyed through continued silting. This examination was undertaken at the special request of the Office of Land Use Coordination.

Allegheny River

Because of almost complete lack of hydrological information on the smaller streams and upper reaches of the Allegheny River, an intensive preliminary examination is required. Gages are being installed on watersheds with typical soils and cover types to determine the influence of vegetation on stream behavior. Snow surveys are being conducted. A detailed study of hydrology is being made, and a great deal of damage information is being assembled. These are being correlated to determine if changes in land use in the upper reaches will give flood reductions which can be routed to and show measurable reductions in the damages at Pittsburgh, the main damage center.

An estimate of the status of all preliminary examinations and surveys can be obtained from the following table.

STATUS OF PROGRESS AS OF JANUARY 1, 1941

Watershed	Area in Square Miles	Percent Completed	Date Completed
PRELIMINARY EXAMINATIONS			
Pequest River	158	95	
Wallkill River	1,198	50	
Schuylkill River	1,900	25	
Juniata River	3,409	60	
Turtle Creek	147	95	
Solomon Creek	18	10	
Allegheny River	11,723	30	
SURVEYS			
Codorus Creek	277	100	11/39
Buffalo Creek	437	100	8/40
Youghiogheny River	1,700	95	3/41
Merrimack River	5,015	95	3/41
Upper Susquehanna River (to Owego, N. Y.)	3,500	40	10/41
Connecticut River (to Bellows Falls, Vt.)	5,231	40	10/41

The locations of the watersheds discussed in this portion of the report are shown on the accompanying map.

Status of Surveys

Buffalo Creek

A report on the survey of Buffalo Creek was submitted to Washington August 19, 1940, recommending: an expenditure of $182,000 for revising land use; $6,780 for annual maintenance of the revisional program; $1,065,300 for stream bank stabilization, which would require an annual maintenance charge of $2,000; and that 37,000 acres be retired from agricultural use to woodlands.

Youghiogheny River

The report on the Youghiogheny watershed has been judged to be inconclusive for the following reasons: Lack of data on the relative effectiveness of various cover types in influencing flood runoff; insufficient hydrologic data to determine the chief flood contributors; and, consequently, inadequate information on the amount of flood damage at Pittsburgh that can be eliminated by flood control work on the Youghiogheny and its tributaries. Improper use of both agricultural and forest land is widespread throughout the watershed. A revised land use program is sorely needed, irrespective of whatever contribution it may make in flood control. Nevertheless, no such program can be projected as a flood control measure unless flood control benefits can be demonstrated. Should the present preliminary examination of the Allegheny watershed reveal that a substantial flood damage reduction will occur through a revised land use program, then it is recommended that the Youghiogheny watershed be studied further, so that a concrete positive or negative report can be made.

Merrimack River

A report has been prepared on the Merrimack River, but it, like that on the Youghiogheny, is also inconclusive. Land use adjustment is sorely needed, but what reduction such readjustment will cause in flood damage has not been determined.

Connecticut River

Survey work on the Connecticut River has continued since the fall of 1939, but due to a deadline of July 1, 1941, for submission of a completed report the work has been confined to the reaches above Bellows Falls, Vermont. This embraces slightly less than one-half of the total watershed area. Preliminary analysis of information collected to date indicates that land use revision for the control of flood flows on this part of the watershed is justifiable. Two-thirds of the area now under investigation is forested, though much is in poor condition. Farm and pasture land is frequently submarginal.

Upper Susquehanna River

Faced with the same deadline as on the Connecticut River, it has been necessary to confine detailed work on the Susquehanna River to slightly more than 50% of the originally designated area. By

July 1, 1941, it is planned to complete a survey for the eastern branch and tributaries above Sayre, Pennsylvania. Forests occupy about one-third of this area, but would cover over one-half of the watershed if present sub-marginal, idle and abandoned agricultural lands were in forest. Cover surveys of all non-agricultural lands and for 60% of the agricultural land have been completed.

It seems unquestionable at the present time that planting of trees on unproductive non-agricultural lands, silvicultural treatment to encourage reproduction and increase density of stocking, and fencing of pastured woods will be among the important survey recommendations. Also, a fairly large scale program for retirement of marginal and sub-marginal farm land will be necessary.

Judging from the yield data from the Cooperstown and Tioga Forest Cooperatives, it appears likely that economic benefits as well as flood control benefits may be claimed for the proposed conversions to forest cover. Approximately 80% of the land now forested apparently will require no treatment other than protection against fire, grazing, and clear cutting to insure good flood protection.

PROGRAM NEEDED FOR THE FUTURE

Weighing the Station's accomplishments and future plans against the broad forestry needs of the region, as sketched in the introductory section, it is clear that substantial progress is being made towards meeting certain phases of the forestry problem. If we are to make certain that our eastern forests are to supply defense needs and at the same time contribute their full share towards the permanent welfare of our country, much additional research is needed. A brief description and justification for the projects requiring study follow:

Forest Fire Research

Forest fire research must be divided between the Coastal Plain and the oak type. Considering that fires cost the region annually some $2,000,000, that the Coastal Plain forests are highly inflammable, and that great conflagrations, causing immense property damage and loss of life have occurred, well directed research to increase the efficiency of forest fire control seems fully justified. As a national defense measure, studies to improve the efficiency of fire control rank very high. Those acquainted with the severe holocausts of the past require little imagination to picture what incendiary bombing might do to the pine forests of the Coastal Plain, or the inflammable oak forests of the anthracite region.

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Management of Timber Lands

This includes studies of forest planting, weeding and cleaning, thinning, improvement cutting, harvest and reproduction cutting, growth and yield; in other words, those biologic studies that are necessary to place timber growing on a business basis. To influence forest management practice, the effectiveness of proposed treatments must be established through experiment, and demonstrated on a commercial scale on experimental forests in each important timber type and economic section. The Station now has five experimental forests. An additional one is needed in the anthracite region.

Fundamental Studies in Tree Physiology.

The Beltsville Research Forest and Laboratory are being developed as a center for attacking problems of fundamental nature that are of national importance. The program proposed covers studies in the collection, extraction, storage, and germination of seed; in the cold and drought hardiness of seedlings; in the nutrition of seedlings and older trees; in the propagation by cuttings and otherwise of important clons or varieties; reaction of trees to defoliation by certain diseases or insects; the influence of light intensity upon the dying and eventual clearing of lower branches; and a host of other fundamental problems. Studies should also be conducted cooperatively by members of the Bureau of Plant Industry and the Station on the toxicity of fungicides to trees, the role of mycorrhiza in nutrition, and various physiologic and pathologic disorders of tree seedlings.

Forest Products and Utilization

Throughout this territory, as elsewhere, low grade forest products are a drug on the market. Yet many new uses have been found for low grade material and many others can be disclosed through systematic study. For many purposes, low grade products can, without loss, be substituted for high grade products, and to do so will relieve the drain on the latter. On the other hand, industries in this territory have certain very special uses for wood that require exacting specifications. Preliminary studies of some of these requirements have shown that considerable loss in high grade material can be avoided through more careful selection to meet the specific needs. In many cases this selection needs to be done in the standing tree, because wood quality, as the Forest Products Laboratory has shown, is intimately related to the growth conditions under which the tree develops. It is expected that considerable economy can be effected in the use of low grade products by developing logging and milling methods whereby small sized dimension stock can be manufactured either in the woods or nearby. The possibilities of reducing logging costs through further refinement in use of trucks require development. Other technical improvements in logging and portable mill operating offer equal opportunities for reducing the cost of one of the major items in lumber production.

The laying out of permanent skid and haul roads, skidding in tree lengths, power bucking, and new loading technique are but a few of the many operations in which experience and preliminary studies have already shown that important savings can be effected.

The pulpwood-logging cost study that the Station participated in last year furnishes an example of the type of result that may be expected from systematic research in this field.

Forest Economics

The first and most important step in planning the mobilization of forest productive capacity for either war time or peace time is to complete a forest inventory to determine accurately the area of forest land in the region, the volume of timber available, its rate of growth, and the annual drain through cutting, fire, disease, and otherwise. The survey of forest employment possibilities in the anthracite region should be extended to cover the counties adjoining those that bear coal measures. Studies of marketing methods and of markets are needed in the Coastal Plain, in the oak, and in the northern hardwood types. Local County Land Use Planning Committees need marketing and other aid to block out economically sound sustained yield units.

Owing to the special problem areas created in the cutover lands of South Jersey, and in certain portions of the Allegheny Plateau, a study should be made to determine what forest improvement measures and sustained yield forestry can do to broaden the base for a permanent economy. Such surveys really are an extension of the type of work now being done in the anthracite region.

Last year's annual report emphasized that the chief expansion in public forest ownership is to be expected at the community level. The means of acquiring and financing community forests, and the economic and social advantages accruing from their management require study by individual cases. Public recreation is one of the major services that forests in this thickly settled territory perform. Existing picnicking, swimming, and other recreational facilities built on national and state forests to accommodate 50 to 500 have been overrun by ten times that number of people. Surveys to determine public requirements as to type, size, number, and location of forest recreational developments are highly important. It has usually been assumed that game, trout streams, ski slides, swimming pools, picnicking and camp grounds, are all that is needed. But no one can fully enjoy the forest who cannot name the common trees, flowers, shrubs and wild creatures; or who, through lack of woods lore, is in constant fear of ivy poisoning, snake bite, getting lost, and unknown dangers. Forest recreational planning should include studies of vacationists and ways of making each a nature lover.

Forest Influences

Forests, through their interception of rain and snow, their influence on snow accumulation and melt, the absorptive power of their duff mantle, their influence on frost penetration, their influence in soil porosity, their use of water in transpiration, and their reduction in surface evaporation, silting, and soil erosion, profoundly affect three major water problems of the region, namely: surface and underground supplies for city use and sewage dilution; mine flooding in the hard and soft coal fields; and surface flooding on the major streams and their tributaries. The influence that forests exert is known to vary with age, stocking, and species composition of the stand, with depth and character of soil, with topography, and with character and distribution of precipitation. To determine how each variable affects the whole, singly and in interaction with others, is the task of forest influence research. To adapt these findings to controlling water movement on individual watersheds is the task of flood control and other water control surveys.

Forest Pathology, Entomology, and Biology

In addition to the work now being done in the region to control major diseases and insect outbreaks, such as Japanese beetle, white pine blister rust, Dutch elm disease, and in such cooperative studies as game management, the Station should conduct specific studies of local problems and render general service work in the fields of entomology, pathology, and general biology. Located at the second largest seaport in the United States, pathologists and entomologists devoting their time to such studies would be invaluable in checking on incipient outbreaks of insects or disease that evade detection by port inspectors. In addition, studies to determine from external evidence the probable extent and seriousness of decay, the rate at which decay is likely to spread, and how to select poor risk trees for removal in thinnings, are particularly needed in the northern hardwood type.

A forest entomologist's chief job in the region would be to keep abreast of current forest insect populations, and to warn the foresters of measures needed to prevent serious outbreak. In addition, he should check on insects damaging shade trees, especially where these are likely to develop into important forest pests. Biological studies of the relation of such wild creatures as seed-eating birds and rodents to forest tree production; the damage done by such mammals as rabbits, snowshoe hare, porcupine, and deer to forest seedlings, saplings, and mature trees; and the relationship of various forest management practices to game and other wild animals are basic to full use of our forest and wildlife resources.

This proposed program of research is large, and may to some seem unwarranted. But when it is realized that the annual timber growth of the region is worth approximately $8,000,000, that it provides raw materials for industries, creating values of approximately $40,000,000, that potential growth is at least double current growth, that in addition

millions of dollars are invested in municipal water supplies, that some $6,600,000 flood damage occurs annually, that mine water pumping in the anthracite fields alone costs $8,000,000, that hundreds of thousands use the forests for recreation and countless others would like to do so, the program proposed seems modest. And finally, considering defense needs and what the totalitarian threat actually implies, failure to strengthen so important a part of our economy as forests and forest industries, through research and otherwise, should not be countenanced.

ALLEGHENY FOREST EXPERIMENT STATION

PERSONNEL - 1940

Overhead Administration

Hardy L. Shirley, Director

Hazel L. Stiles, Principal Clerk
Margaret R. Evans, Clerk
Laura Lewis, Assistant Clerk
Katherine F. McKeaney, Junior Stenographer

Field Divisions

Beltsville Experimental Forest, Laurel, Maryland

T. Ewald Maki, Silviculturist
Ralph P. Broomall, Assistant to Technician

Eastern Shore Experimental Forest, Parsonsburg, Maryland

Alonzo B. Crow, Junior Forester (LWOP 9/25/40)

Kane Experimental Forest, Kane, Pennsylvania

John E. Hetzel, Junior Forester (Resigned 8/1/40)

Lebanon Experimental Forest, New Lisbon, New Jersey

Silas Little, Jr., Assistant Silviculturist

Standing Stone Experimental Forest, Manor Hill, Pennsylvania

Frederick H. McClennen, Jr., Under Assistant to Technician

Work Projects

Forest Management

(Hardy L. Shirley, In Charge)

Lillian E. Taylor, Sr. Clerk (Statistical)
Mildred Shugert, Under Clerk Typist

Beech-Birch-Maple-Hemlock

Ashbel F. Hough, Assistant Silviculturist
Carl E. Ostrom, Junior Forest Ecologist (LWOP 10/31/40)
John E. Hetzel, Junior Forester (Resigned 8/1/40)
Miles J. Ferree, Student Assistant (1-1/2 months)
James F. Heagy, Student Assistant (1-1/2 months)
John S. Kookogey, Student Assistant (1-1/2 months)
John R. Burns, Under Engineering Aid (1-1/4 months)

Forest Management (cont'd)

Oak-Pine

G. Luther Schnur, Silviculturist
Silas Little, Jr., Assistant Silviculturist
Alonzo B. Crow, Junior Forester
Frederick H. McClennen, Jr., Minor Asst. to Technician
Paul F. Graves, Student Assistant (3 months)
Jesse G. Ralston, Agricultural Aid (1 month)
Herbert W. Turberville, Agricultural Aid (4 months)

Beltsville Forest Laboratory

T. Ewald Maki, Silviculturist

Forest Economics

Reginald D. Forbes, Senior Forester, In Charge
Clement Mesavage, Assistant Forester
Clifford W. Beck, Agent
Evelyn Manzi, Junior Stenographer
Edward W. Carter, Special Advisor
Michael Olexis, Under Field Assistant (6 months)
James A. Noonan, Junior Field Assistant (6 months)
Robert Kaufman, Student Assistant (3 months)

Flood Control Surveys

Wm. Mollenhauer, Jr., Forester, In Charge
Clarence N. Morang, Associate Engineer (Appt. 3/20/40)
David W. Lippert, Assistant Forester
Richard J. MacConnell, Assistant Engineer (Hydraulic)
(Transferred to Weather Bureau 1/22/40)
Edward Bogdziewicz, Engineering Draftsman
Eileen M. Fry, Assistant Clerk Stenographer
Florence Aronson, Junior Stenographer

Preliminary Surveys

Earl J. Rogers, Assistant Forester

Allegheny-Kiskiminitas Survey

Frank F. Tuthill, Associate Forester, Senior Representative
Raymond W. Pierce, Assistant Engineer (Hydraulic)
(Detailed to Washington Office 8/26/40)
Emil F. Meyer, Assistant Forester
Harold L. Mitchell, Field Assistant (6 months)
Isador M. Aaron, Field Assistant (6 months)

Flood Control Surveys (cont'd)

Upper Susquehanna

Charles H. Diebold, Associate Forester, Senior Representative (Detailed to Washington Office 7/1/40)
Harold L. Mitchell, Associate Silviculturist (Appointed Senior Representative 6/19/40)
Edward B. Williams, Assistant Forester
Marshall T. Augustine, Junior Forester
Herbert J. Mols, Junior Forester
Earl J. McCracken, Assistant Agricultural Aid
Arthur E. Gruhl, Assistant Agricultural Aid (Appointed 12/2/40)
Charles E. Critchfield, Laborer

Connecticut

Walter K. Starr, Associate Conservationist, Project Leader
J. Harold Bauer, Assistant Engineer
Harold F. Morey, Assistant Silviculturist, Acting Senior Representative
Theodore R. Jones, Assistant Forester
Basil A. Plusnin, Junior Forester
Nicholas Ball, Jr., Junior Engineer (Resigned 8/27/40)
George R. Trimble, Jr., Junior Forester
Sidney J. Grossman, Junior Forester
Halsey M. Hicks, Junior Forester
Harry Roger Slayback, Assistant to Technician
Eli J. Fenchak, Under Assistant to Technician
Marlin E. Wolfe, Assistant Agricultural Aid (Appointed 12/2/40)
Richard M. Sawyer, Assistant Engineering Draftsman
Andrew J. Nelson, Assistant Engineering Draftsman
Evelyn C. Emerson, Assistant Clerk Stenographer

PUBLICATIONS, CALENDAR YEAR 1940

Printed

Diebold, C. H.	Strip planting for flood control. Jour. Forestry 38(10):810-12.
Hough, A. F.	The Allegheny Forest Experiment Station. Forest Leaves, 30(1):9-10.
Hough, A. F.	Tionesta Area formally established. Forest Leaves, 30(5):11.
Hough, A. F.	Tionesta Forest formally set aside. American Forests, 46(12):565.
Mesavage, Clement	Forestry and the Pennsylvania anthracite coal region. Forest Leaves, 30(1):1-2, 13-14.
Schnur, G. Luther	Certified holly. Forest Leaves, 30(6):3.
Shirley, Hardy L.	The task for a central forest seed laboratory. Forest Leaves, 30(2):3, 11.

Multilithed

*Forbes, R. D. and Mesavage, Clement	Survey of forest employment possibilities in the anthracite forest region. Anthracite Survey Paper No. 1. 7 pp.
*Forbes, R. D. and Mesavage, Clement	Intensified protection of Wyoming Valley forests against fire, through the use of community labor. Anthracite Survey Paper No. 2. 7 pp., 5 maps.
Forbes, R. D.	Accomplishments of the Allegheny Forest Experiment Station 1927-1940. 29 pp.
*Hetzel, J. E.	Some recent improvements in the transportation and storage of planting stock in the field. Occasional Paper No. 2. 4 pp., 6 figs.
*Little, Silas, Jr.	Seed fall of Atlantic white-cedar. Technical Note No. 26.
*Little, Silas, Jr.	Seed fall of shortleaf pine. Technical Note No. 27.
*Ostrom, Carl E.	Pulpwood volume tables for second growth black cherry, sugar maple, and beech in northwestern Pennsylvania. Technical Note No. 30.
*Schnur, G. Luther	Volume table for sugar maple (Acer saccharum Marsh.). Technical Note No. 28.
*Schnur, G. Luther	Volume table for beech (Fagus grandifolia Ehr.). Technical Note No. 29.

*Available for distribution.

RS-AL
SILVICULTURE
Stand improvement

PROJECT STATUS SHEET

January 31, 1941

STAND IMPROVEMENT

FIELD DIVISION: Forest Management Research

WORK PROJECT: Silviculture

LINE PROJECT: Stand improvement, beech-birch-maple-hemlock

PURPOSE:

To determine the effect of various stand improvement treatments on the composition, growth, and quality of immature stands and to devise practical methods by which large acreages of second growth forest may be improved as sources of forest products.

REVIEW OF PAST WORK:

Commercial thinnings in 40-year-old second growth, removing 1/3 of cordwood volume, result in little reproduction and break the crown canopy, causing danger of glaze damage and sunscald. Weedings in 13- to 18-year-old reproduction cost up to $10.00 per acre and are probably of limited value for stands inadequately stocked with desirable trees such as the usual inferior third growth. To avoid decay hazards in thinning of multiple stems, weedings should be made before the stand reaches 20 years of age. Mowing advance growth and desprouting stumps is being tried as preweeding stand improvement measures.

ACCOMPLISHMENTS DURING PAST YEAR:

Cost of producing pulpwood from trees 5-8 inches d. b. h. was found to be almost double that from trees 11 inches d. b. h. and over.

PLANS FOR NEXT YEAR:

Currently examine plots on Kane Experimental Forest and establish additional plots to study light improvement thinnings. Analyze 5-year remeasurements of thinned plots and publish results.

DATE OF COMPLETION:

Indefinite.

ASSIGNMENT:

Shirley, Hough, Ostrom.

RS-AL
SILVICULTURE
Stand improvement

PROJECT STATUS SHEET

January 31, 1941

STAND IMPROVEMENT

FIELD DIVISION: Forest Management Research

WORK PROJECT: Silviculture

LINE PROJECT: Stand improvement, oak-pine, Coastal Plain, New Jersey, Delaware, and Maryland

PURPOSE:

To determine the effect of various stand improvement treatments on the composition, growth, and quality of immature stands and to devise practical methods of treating large acreages and to estimate costs thereof.

REVIEW OF PAST WORK:

A single thinning in 15-year-old oak in South Jersey proved insufficient to encourage natural pine reproduction or growth of interplanted stock. Demonstration thinnings of Virginia pine (P. virginiana) in Maryland show the desirability of early thinnings (about 10 years of age) in dense, stagnant, old-field stands, with two later thinnings reducing stand to 700 trees per acre at 25 years.

Demonstration thinning and pruning of 25-year plantation white pine (P. strobus) indicate the desirability of thinning 6 x 6 plantations at 15-20 years of age. Pruning with a hand saw climbing up the tree and working down is the most desirable of many methods tested.

ACCOMPLISHMENTS DURING PAST YEAR.

In cooperation with Maryland Department of Forestry, established series of thinning demonstration plots in loblolly pine. Overwood and sprouts on thinning plots in New Jersey remeasured and data summarized.

PLANS FOR NEXT YEAR:

In New Jersey. Analyze data from thinning plots and prepare a progress report.

In Maryland. Make plans for series of stand improvement cuttings in loblolly pine to determine economic methods for improving stands, building up growing stock, and providing continued income.

DATE OF COMPLETION.

Indefinite.

ASSIGNMENT.

New Jersey: Little and Junior Forester. Maryland: Schnur.

RS-AL
SILVICULTURE
Harvest cuttings

PROJECT STATUS SHEET

January 31, 1941

HARVEST CUTTINGS

FIELD DIVISION: Forest Management Research

WORK PROJECT: Silviculture

LINE PROJECT: Harvest cuttings, beech-birch-maple-hemlock

PURPOSE:

To determine commercially feasible methods of harvesting timber that will prolong the cutting period, gradually increase the quality of timber, perpetuate desirable species, and return high total yields.

REVIEW OF PAST WORK:

Partial cuttings applied to 60-year-old second growth with holdovers in a combined saw timber and chemical wood operation left the stand in excellent condition for production of future saw timber. Cutting to a 10-inch diameter limit was less successful, since mortality of the reserved stand was high. Mature stands containing advanced growth of desirable species can be clearcut with the assurance that a good stand will follow, but clearcutting in immature second growth stands leads to poor quality third growth in which decay susceptible stump sprouts and pin cherry are dominant.

ACCOMPLISHMENTS DURING PAST YEAR:

Studies in 2 stands of black cherry-sugar maple partially cut for saw timber some 45 years ago indicate that heavy partial cuttings made at intervals of 40 to 50 years result in greater total yield than clearcutting. A wide range in tree sizes in even-aged stands of these species, together with their excellent response to release cuttings makes them well suited for selection cutting.

PLANS FOR NEXT YEAR

Data already collected will be examined to determine whether still greater yields may be anticipated from lighter cuttings repeated at shorter intervals. A series of light partial cutting plots in old growth on the Kane Experimental Forest will be established.

DATE OF COMPLETION:

Indefinite.

ASSIGNMENT:

Shirley, Hough, Ostrom.

RS-AL
SILVICULTURE
Harvest Cuttings

PROJECT STATUS SHEET

January 31, 1941

HARVEST CUTTINGS

FIELD DIVISION. Forest Management Research

WORK PROJECT: Silviculture

LINE PROJECT. Harvest cuttings, oak-pine (New Jersey)

PURPOSE:

To determine practical methods of harvesting decadent oak-pine stands so that the succeeding stands will be chiefly of seedling origin and with a high percentage of pine, and in swamps of white-cedar.

REVIEW OF PAST WORK.

This is a new project begun in 1940 to develop practical methods of applying knowledge gained through silvical studies in this type.

ACCOMPLISHMENTS DURING PAST YEAR.

In cooperation with the State Department of Conservation and Development and the CCC, 56 plots in 2 types of oak-pine stands and on 2 State Forests were established to test the use of seed tree cuttings, followed by varying types of brush disposal and soil scarification as methods of securing natural seedling reproduction of pine

PLANS FOR NEXT YEAR.

Further tests on a more extensive scale, and remeasurements on plots already established.

With aid of the CCC, initiate exploratory work in swamp types - both hardwood and pine - to determine. (a) under what conditions available cedar seed trees can be used effectively in obtaining an adequate amount of cedar reproduction, (b) under what conditions and to what degree sowing of seed or planting of seedlings would be effective in establishing a cedar stand.

DATE OF COMPLETION.

Indefinite.

ASSIGNMENT.

Little and Junior Forester.

RS-A1
SILVICULTURE
Silvics

PROJECT STATUS SHEET

January 31, 1941

SILVICS

FIELD DIVISION: Forest Management Research

WORK PROJECT: Silviculture

LINE PROJECT: Silvics, oak-pine

PURPOSE:

To determine, as the basis for silvicultural practices, the ecology of stands, and the silvical characters of the principal species, including the effect of environmental factors on natural regeneration by seed or sprout.

REVIEW OF PAST WORK:

Seed production of oak, seed dispersal of pine and Atlantic white-cedar, effect of site, animals, insects, and seedbed on reproduction in the oak-pine type; relation between leaf area and root system of sprouts and those of parent tree; vigor of sprouting by species of oak have been studied and reported in 17 technical notes and papers in various journals.

ACCOMPLISHMENTS DURING PAST YEAR:

During a 2-year period, 17 million seeds per acre fell under a mature white-cedar stand. During a 3-year period, pine seed fall totaled 8,000 to 925,000 per acre in typical oak-pine stands. The data show the possibility of increasing the amount of these desirable species by following management practices that favor their germination and establishment. As a basis for white-cedar management, a study of lowland sites in southern New Jersey was initiated to determine the successional stages and climax and the factors controlling succession.

PLANS FOR NEXT YEAR:

Complete report on phenological observations. Complete preliminary report on white-cedar study and obtain additional field data to strengthen weak portions.

DATE OF COMPLETION:

1943.

ASSIGNMENT:

Little and Junior Forester.

RS-AL
SILVICULTURE
Silvics

PROJECT STATUS SHEET

January 31, 1941

SILVICS

FIELD DIVISION. Forest Management Research

WORK PROJECT: Silviculture

LINE PROJECT. Silvics, beech-birch-maple-hemlock

PURPOSE.

To determine the silvical characteristics of species and the ecology of stands, as the bases for silvicultural practices.

REVIEW OF PAST WORK.

Drought, glaze, frost, fire, and wind, within the general climatic region of the Allegheny Plateau, cause widespread losses in mature stands and young growth. Minor soil differences were found to have little effect on composition and growth of stands, but major features, such as poor drainage, markedly influenced both composition and growth. Hardwood competition has almost completely eliminated the high yielding white pine and has seriously reduced the amount of hemlock. Life histories of stands show that white pine and hemlock, the desirable black cherry, white ash, yellow poplar, and basswood, as well as the less desirable birches and red maple, become established following such catastrophes as windthrow, drought, or fire. Repeated fires favor aspen and pin cherry at the expense of valuable conifers and hardwoods. Deer browse on all hardwoods and hemlock, rabbits prefer maples and beech.

ACCOMPLISHMENTS DURING PAST YEAR:

The results of seven years' weather records from four stations on the Kane Experimental Forest plainly show that tree cover moderates the microclimate. "Frost pockets", cold areas on which tree reproduction is slow to become established, occur on low ground after clear cutting. Similar low areas covered with high forest do not show "frost pocket" conditions. Elevation, aspect, slope, and soil in their gross effect significantly influenced species composition of natural second growth stands on 68 plots from 17 localities in northern Pennsylvania. These stands ran high to beech and sugar maple following partial cuttings and included more and more black cherry as the original logging approached a clear cutting. Additional information on the silvics of black cherry and sugar maple were obtained in 120-year-old stands partially cut 30 to 45 years ago.

PLANS FOR NEXT YEAR:

A manuscript for a Departmental circular or bulletin on the silvics and ecology of this type will be completed. Further studies will be made in stands cut over at various times during the past to check the conclusions reached from studies in virgin stands, and to form the basis for more detailed recommendations on silvicultural practice.

DATE OF COMPLETION:

Indefinite.

ASSIGNMENT:

Shirley, Hough, Ostrom.

RS-AL
SILVICULTURE
Silvics
Fundamental studies

PROJECT STATUS SHEET

January 31, 1941

FOREST MANAGEMENT, FUNDAMENTAL STUDIES

FIELD DIVISION: Forest Management

WORK PROJECT: Silviculture

LINE PROJECT: Silvics, Fundamental Studies, Beltsville

PURPOSE.

To test, measure, and evaluate the effect and importance of physiologic, edaphic, and genetic factors on the establishment, survival, and development of various tree species and, whenever possible, to deduce general laws and principles which can serve as a basis for broadening the applicability of the findings.

REVIEW OF PAST WORK:

A new assignment, hence, no past work.

ACCOMPLISHMENTS DURING PAST YEAR.

Laboratory, main physical plant, and grounds developed, equipped, and improved for occupancy and use. Road, trail, and other forest improvement programs outlined and scheduled for action by the CCC during the coming year. Preliminary survey of fundamental problems completed. Review of growth substance literature, as related to forest regeneration, initiated. Plans outlined for undertaking intensive research into certain phases of seedling physiology.

PLANS FOR NEXT YEAR.

Review of growth substance literature will be completed and a compendium prepared. Working plan of drought inducement in forest planting stock will be prepared and specific studies undertaken. Problem analysis of the field will be given further consideration. Survey and inventory of the experimental forest will be made if help becomes available. Forest improvement program will be continued with CCC help.

DATE OF COMPLETION.

Indefinite.

ASSIGNMENT.

Maki and staff.

RS-AL
FIRE
Behavior

PROJECT STATUS SHEET

January 31, 1941

BEHAVIOR OF FIRE

FIELD DIVISION: Forest Management Research

WORK PROJECT. Forest fire protection

LINE PROJECT. Behavior

PURPOSE.

To obtain information relative to forest fire behavior necessary for the formulation of sound policies and plans for fire protection. Includes studies of fire weather, fuel type classification, rate of spread, and resistance to control.

REVIEW OF PAST WORK.

Started in 1936 in cooperation with the New Jersey Forest Fire Service and R-7, U. S. F. S. Fuel type manuals for North and South Jersey have been prepared. Analyses of 70 fires have shown that fire spreads three times as fast in pine as in oak, and how fire occurrence is influenced by weather. Based on State records (1935-38), tests of a modified Appalachian type 3 meter showed that in the central division 63% of all fires occurred during 54 spring days, rating average to extreme, and that these fires accounted for 95% of the total burned area and 82% of the total suppression costs.

ACCOMPLISHMENTS DURING PAST YEAR

Report on 1938-39 tests of Appalachian type 5-A meter showed that (1) "Days since a rain of 0.50" or more" does not evaluate properly the moisture content of the lower portion of the litter. A refinement of the rainfall classes or use of fuel moisture sticks covered with burlap appear to offer satisfactory solutions. (2) The present method of measuring wind velocity needs modification, because the complete scale was never used. (3) Based on actual weather conditions, the forecast side of the meter agreed with the current side only 56% of the time. With some changes, the accuracy of the forecast side was increased to 79%.

PLANS FOR NEXT YEAR.

Prepare report giving results of 1938-40 tests of Appalachian type 5-A meter in southern New Jersey.

DATE OF COMPLETION.

1941.

ASSIGNMENT:

Shirley, Little, and Junior Forester.

RS-AL
FIRE
Control

PROJECT STATUS SHEET

January 31, 1941

CONTROL OF FIRE

FIELD DIVISION. Forest Management Research

WORK PROJECT. Forest fire protection

LINE PROJECT. Control

PURPOSE

To obtain information essential to the sound planning of forest fire control. Includes elapsed time, cost, transportation, fire-break, and water supply studies.

REVIEW OF PAST WORK

Started in 1936 in cooperation with New Jersey Forest Fire Service and R-7, U. S. F. S. Transportation and water supply studies on 186 fires showed tank trucks could have been used advantageously on 86%. Methods of mapping and classifying roads and water supplies for fire protection determined. Encouraged by these studies, New Jersey has now developed an effective fleet of tank trucks. Punch card analysis made of New Jersey forest fire record for period 1931-38.

ACCOMPLISHMENTS DURING PAST YEAR

First draft of manuscript on forest fires in New Jersey, based on 1931-38 data, was prepared. In cooperation with State and CCC, experimental work in comparing effectiveness and costs of disked fire-breaks with those prepared and maintained by burning, was started.

PLANS FOR NEXT YEAR

Complete manuscript on forest fires in New Jersey for 1931-38.

DATE OF COMPLETION

1941.

ASSIGNMENT

Shirley, Little, and Junior Forester.

RS-AL
FIRE
Effects

PROJECT STATUS SHEET

January 31, 1941

EFFECTS OF FIRE

FIELD DIVISION: Forest Management Research

WORK PROJECT: Forest fire protection

LINE PROJECT: Effects

PURPOSE:

To determine the effects of fire on the tree, the forest, and the site, including effects of controlled fires on seedbed conditions and species composition, as a basis for formulating sound silvicultural and fire protection policies and plans.

REVIEW OF PAST WORK:

Comparative fire resistance determined for six important tree species, 1930. In cooperation with the State of New Jersey, a revised method of appraising fire damage was worked out, an 80-acre controlled burning experiment was begun in 1936-37. Fire damage to standing trees from controlled burning was found to be reduced by use of the safety-strip method of pre-treatment.

ACCOMPLISHMENTS DURING PAST YEAR.

In cooperation with the New Jersey Department of Conservation and Development and the CCC, a second controlled burning study was initiated to determine: (1) number of annual burns necessary for the preparation of a seedbed for pine; (2) value of thinnings used with controlled burning in favoring pine reproduction and in lessening damage to the present stand, (3) effectiveness and cost of controlled burning in comparison with mechanical or with other seedbed treatments.

PLANS FOR NEXT YEAR.

Continue treatments on both controlled burning studies according to plans, and remeasure all plots on 80-acre experiment.

DATE OF COMPLETION:

1952 for both present studies.

ASSIGNMENT:

Shirley, Little, and Junior Forester.

RS-AL
MENSURATION
Stand studies

PROJECT STATUS SHEET

January 31, 1941

STAND DEVELOPMENT, GROWTH AND YIELD

FIELD DIVISION: Forest Management Research

WORK PROJECT Mensuration

LINE PROJECT Stand studies

PURPOSE:

To determine the growth and yield of stands, and to analyze the factors governing growth and development as a basis for sound forest management.

REVIEW OF PAST WORK:

Growth and development studies of loblolly pine were begun by the Forest Service in Maryland in 1906 and maintained in cooperation with the Maryland State Department of Forestry. Results of past studies were published in one Maryland State Bulletin and two Journal of Agri. Research articles. In cooperation with R-7, U. S. F. S., and Maryland State Department of Forestry, a growth study on a 50,000 acre sustained yield unit in Worcester County, Maryland, was completed. Average growth on 22,155 acres of merchantable and pine pole stands was found to be 360 board feet per acre per year. Mean annual diameter growth of 0.16-0.18 and 0.10-0.15 inches for pines and hardwoods respectively were found. Average mortality in 5 years for loblolly pine was found to be 42% for 2-inch trees, 9% for 8-inch, 1% for 12-inch, and 0% for all trees above 16 inches. Volume tables for loblolly pine are available in Technical Note #25. Volume and yield tables for oak were published in USDA Tech. Bull. 560.

ACCOMPLISHMENTS DURING PAST YEAR:

A problem analysis for the oak-pine type in Delaware and Maryland was prepared.

PLANS FOR NEXT YEAR:

Remeasure loblolly pine permanent sample plots before the growing season. Analyze the records then available and prepare a paper on the growth and development of natural old-field stands of loblolly pine if the records show sufficient results. Prepare a problem analysis for the oak type.

DATE OF COMPLETION

Indefinite.

ASSIGNMENT:

Schnur and Broomall.

RS-AL
REGENERATION
Planting

PROJECT STATUS SHEET

January 31, 1941

FOREST PLANTING

FIELD DIVISION: Forest Management Research

WORK PROJECT: Regeneration

LINE PROJECT: Planting

PURPOSE:

To determine the silvical and economic factors governing the restoration of depleted or denuded forest lands by planting or seeding.

REVIEW OF PAST WORK:

Coniferous interplantings to improve stand composition were made in young oak coppice in southern New Jersey in 1930-33. Two release cuttings have been made. Preliminary results are available in two published articles. In cooperation with Lake States Station, red pine seedlings from 50 seed sources and 9 climatic regions were planted in 1937 at Kane, Pa. A study of 3-10-year-old administrative plantations on Allegheny Forest and adjacent areas in 1936-37 indicate species best adapted to various sites and conditions. Study of size of stock, methods of planting, and species adaptation on difficult sites started in test plantations in 1938.

ACCOMPLISHMENTS DURING PAST YEAR:

Data from remeasurements of New Jersey interplantings were summarized and another release cutting was made on 25 acres of these interplantings. The use of a collapsible crate for shipping planting stock, central heeling-in beds, and a special wire basket for transporting stock from bed to field was outlined in Occasional Paper #2. The survey of older plantations in northeastern Pennsylvania, begun in cooperation with the Pennsylvania Department of Forests and Waters in 1939, was completed. Red pine was the most successful species both as to survival, diameter growth, and form. Hardwoods were generally not successful. Row mixtures of species usually failed to produce desired results; block mixtures were successful.

PLANS FOR NEXT YEAR:

Complete report on New Jersey interplantings. If possible, initiate and complete a short-term study of New Jersey interplantings, in cooperation with the Department of Conservation and Development. Prepare data on test plantations and survey of older plantations in Pennsylvania for publication.

DATE OF COMPLETION:

1945 for New Jersey work; 1977 for red pine source of seed study.

ASSIGNMENT:

Shirley, Hough, Ostrom, Little, Junior Forester.

RE-AL
SOCIAL BENEFITS
Anthracite Region

PROJECT STATUS SHEET

January 31, 1941

FOREST EMPLOYMENT POSSIBILITIES, ANTHRACITE REGION

FIELD DIVISION: Forest Economics Research

WORK PROJECT: Private forestry

LINE PROJECT: Social aspects

PURPOSE

To determine the extent and character of possible forest employment in the anthracite coal region, now and in the future.

REVIEW OF PAST WORK:

Project begun in 1939 with appointment of Junior Forester on August 1 and Senior Forester December 1. Preliminary information compiled and problem analysis begun.

ACCOMPLISHMENTS DURING PAST YEAR

Problem analysis and general work plan was prepared, simplified version publicized. In cooperation with R-7 and Pennsylvania Bureau of Forestry compiled list of desirable fire improvements, generalized for the territory, intensive for Wyoming Valley, estimated labor requirements, recommendations publicized. With help of Girard and Garver, drafted field and office instructions for forest inventory, prepared local volume tables, and with WPA help completed 82% of field work in Luzerne County. County records studied to determine number and size of forest properties owned by counties and private owners, current assessments, and extent of tax delinquency. Base, forest ownership, forest area, and other maps prepared. Vegetation growing on mine banks studied. Work plan for studies of drain, requirements, and employment in local forest industries drafted.

PLANS FOR NEXT YEAR:

Completion in field and office of inventory of Luzerne County and of county studies of growth, drain, and requirements. Publication on the forest resources of county in relation to employment, under sustained yield and permanent management for recreation and watershed protection. Inventory to be extended into additional counties. Also publication of notes on (1) forest ownerships, rates of taxation, and current tax delinquency; (2) local tree volumes.

DATE OF COMPLETION:

Final regional reports (one or more) by July 1, 1943.

ASSIGNMENT:

Forbes, Mesavage, Beck.

RIFC-AL
FLOOD CONTROL
Preliminary examinations

PROJECT STATUS SHEET

January 31, 1941

PRELIMINARY EXAMINATIONS, FLOOD CONTROL

FIELD DIVISION. Flood Control Surveys

WORK PROJECT. Flood Control Surveys

LINE PROJECT. Preliminary examinations, flood control

PURPOSE.

In cooperation with the Soil Conservation Service and Bureau of Agricultural Economics, to determine from preliminary examinations of watersheds in New England and Middle Atlantic States, as listed in the Flood Control Act of 1936 and its amendments, whether there is justification for a flood control survey.

REVIEW OF PAST WORK.

Preliminary examination reports with positive recommendations have been submitted on the Upper Susquehanna River (New York and Pennsylvania), Connecticut River (New Hampshire, Vermont, Massachusetts, and Connecticut), Lehigh, Youghiogheny (Pennsylvania, Maryland, and West Virginia), Kiskiminitas, Conemaugh, Cedorus, and Allegheny Rivers in Pennsylvania, and Patuxent River (Maryland). Negative recommendations are found in report on the Blackstone River (Rhode Island and Massachusetts), and Passaic River in New Jersey.

ACCOMPLISHMENTS DURING PAST YEAR.

Progress was made on preliminary examination for the Schuylkill River, Juniata River, Solomon Creek (tributary of the Susquehanna), and Allegheny River, all in Pennsylvania. Reports on the Pequest River and Turtle Creek were completed. Preliminary reconnaissance reports were completed for local flood problems near Milford, New Jersey, and for several rivers in Westchester County, New York. A report is nearing completion for the flood problem in south New Jersey.

PLANS FOR NEXT YEAR.

Continuation of the Allegheny River during next year and completion of preliminary examination reports for the Juniata River, Schuylkill River, and Solomon Creek the first half of next year. The beginning of preliminary examinations on the Mohawk River in New York and Winooski River in Vermont, respectively, and revision of the preliminary examination of the Lehigh River in Pennsylvania.

DATE OF COMPLETION.

1945.

ASSIGNMENT.

Regional Office. Mollenhauer, Morang, Tuthill, Meyer, Rogers, Bogdziewicz.

RIFC-AL
FLOOD CONTROL
Watershed Surveys

PROJECT STATUS SHEET

January 31, 1941

WATERSHED SURVEYS, FLOOD CONTROL

FIELD DIVISION: Flood Control Surveys

WORK PROJECT: Flood Control Surveys

LINE PROJECT: Watershed surveys, flood control

PURPOSE:

In cooperation with Soil Conservation Service and Bureau of Agricultural Economics, to determine by detailed surveys of designated watersheds if revised land use and upstream engineering measures will aid significantly in control of floods and erosion.

REVIEW OF PAST WORK:

Survey reports on Buffalo Creek and Codorus Creek have been submitted to Washington. The Merrimack and Youghiogheny Rivers survey reports are still in review in the Region. Field surveys have been in progress on the Upper Susquehanna and Connecticut Rivers for a year.

ACCOMPLISHMENTS DURING PAST YEAR:

Considerable time has been spent reviewing and editing the survey reports on the Merrimack, Codorus, Buffalo, and Youghiogheny Rivers.

PLANS FOR NEXT YEAR.

Complete the Connecticut watershed north of Bellows Falls and as much as possible of that below this point, complete the Upper Susquehanna to Owego, New York, and as much of the western half as possible. Revise Merrimack survey. Complete review of Youghiogheny.

DATE OF COMPLETION:

Indefinite. The project should be continued until all major flood contributing streams have been surveyed.

ASSIGNMENT:

Regional Office. Mollenhauer, Lippert, Morang, Fry, Aronson.

Connecticut Survey Office: Starr, Morey, Jones, Bauer, Plusnin, Grossman, Trimble, Sawyer, Emerson, Hicks, Nelson, Slayback, Fenchak, Wolfe, Ferguson, Junior Engineer (Hydraulic).

Upper Susquehanna Office. Mitchell, Williams, Augustine, Mols, McCracken, Critchfield.

ALLEGHENY FOREST RESEARCH ADVISORY COUNCIL

July 1940

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